Appendix E
Sample Scope of Work

DETAILED SPECIFICATIONS

WORK ORDER NO. -----

1. PROJECT: Survey III Mapping Project

2. LOCATION: Huntsville, Alabama

3. GENERAL: Perform field topographic, planimetric, and utility surveys, office computations, and 3D digital mapping for use in developing "Plans and Specifications" as detailed in this scope of work.

4. SPECIFIC REQUIREMENTS:

a. Horizontal control for the project shall comply with Corps of Engineers Third-Order standards as outlined in EM 1110-1-1005.

b. Vertical control shall be Fourth-Order per EM 1110-1-1005.

c. Using control (NAD 83 and NGVD 29) provided by the Government, the Contractor shall lay out horizontal and vertical control in project areas. Control points shall be semi-permanent (re-bar w/cap) and set in a manner that they can be used for layout during construction. From said control points, the Contractor shall acquire field topographic (cross-sections or random topo) and planimetric information (buildings, roads, parking areas, sidewalks, fence lines, structures, drainage, etc.) to be used for 40 scale mapping with a one (1) foot contour interval. Density of field elevations shall support 1" = 40' mapping and shall be provided as necessary to show all breaks in grade or changes in terrain. Also the Contractor shall locate and tie individual trees (size and species) in the project area. All elevations shall be taken to the hundredth of a foot. All horizontal and vertical data will be collected with an electronic data collector using the Government-furnished data collection codes. The Contractor shall also simultaneously record data in the field book. This will include setups, backsights, measure ups, shot numbers, and shot descriptions. Angles and distances shall be recorded for every + 20 shots. The Contractor shall furnish the Government the field files (collection and the edited and compiled field file) along with the final coordinate file for all work. Vertical control for utilities shall be taken with a total station instrument, with measure downs for the invert elevations. All vertical control for utilities shall be recorded in field along with any sketches required. Utility information is required for the following:

(1) Water - Locate all valves, standpipes, regulators, etc. Locate all fire hydrants. Provide an elevation on top of valve case and top of valve. Provide size of pipe and distance above ground for standpipes.

(2) Sanitary Sewer - Locate all manholes and provide top of rim elevation along with an invert elevation of all pipes connected to the manhole. Identify type, size, and direction of each pipe.

(3) Storm Drainage - Locate manholes and all other storm drainage structures such as culverts, headwalls, catch basins, and clean-outs. Provide top of manhole or top of catch basin elevation along with an invert elevation of all pipes connected to a manhole or catch basin and bottom elevation. Identify type, size, and direction of each pipe. Provide type, size, and invert elevation for all culverts.

(4) Electrical - Locate all power poles, guy wires, vaults, manholes, meters, transformers, electrical boxes, and substations. Obtain type and height of poles, number and size of transformers, number of crossarms, number of wires (electrical and communication), direction and low wire elevation at each pole. Provide top of rim or top of vault elevation, top of wire or conduit elevation, direction and bottom elevation of manholes and vaults. Provide size for all electrical vaults and boxes.

(5) Gas - Locate all valves, meters, and gas line markers. Provide elevation on top of valve case and on top of valve.

(6) Telephone - Locate all poles, manholes, boxes, etc. Provide top of rim elevation, top of wire or conduit elevation, direction and bottom of manhole elevation. Obtain type and height of poles, number of crossarms, number of wires and low wire elevation at each pole.

(7) Street Light - Locate all poles and provide type and height of poles. Identify number and type of lights on poles. If connected by wires, show direction and low wire elevation.

(8) Heating - Locate all steam manholes and vaults, filler pipes, underground fuel tanks, etc. Provide top of rim or top of vault elevation, top of pipe elevation, direction and bottom of pit elevation. Provide size of vault and all pipe sizes within manhole or vault.

(9) Fire Alarm - Locate any fire alarm systems (box with number), telephones (box with number), etc. in project.

d. All computations are to be arranged in a sequential and understandable order, with notes when appropriate so a review can be made with minimum reconstruction. The Contractor shall furnish the Government computer output of unadjusted bearings, azimuths, distances, and coordinates of all traverse points. The error of closure, both azimuth and positions, shall be shown. Final data will be adjusted by the compass method and will show the adjusted bearings, distances, and coordinates of all points surveyed. The Contractor shall provide a final list of coordinates for all points. The Contractor shall use the combined grid factor for all work. All level lines shall be reduced and adjusted in accordance with accepted procedures and practices. All computations shall be fastened into an 8-1/2" X 11" folder separated and labeled to indicate various facets of work (horizontal, vertical).

e. Field note books standards:

(1) Field books shall be neat, legible, and sequential. They will also show names of crew members and date at the beginning of each day. Black ink shall be used.

(2) Each field book shall have an index. The serial number and type of instruments used will be shown on this page.

(3) There is to be a maximum of one (1) horizontal setup per page.

f. Target computer system. The Contractor shall provide interactive graphic and nongraphic data files that are fully operational on an Intergraph computer system running MicroStation software, version 4.0 or better. The files shall be created using Government-furnished seed file to ensure compatibility with mapping procedures and standards.

g. Utility information. All utilities that are field tied shall be merged into the Government-furnished 1" = 40' topographic database. This includes showing manholes, valves, power poles, etc., and connecting lines. Also the attribute information (text) for each utility shall be placed in the data file. This can include but not be limited to top of rim elevations, invert elevations, pipe size, direction, top of valve elevation, etc. (See Government-furnished example.) All horizontal and vertical control established for ties shall be shown as a symbol with annotation. Also, see Appendix A for breakdown of level assignments, level symbology, and text size.

h. Map symbols. All symbols shall conform with Government-furnished cell file (CIVSUR.CEL). See Appendix B for complete breakdown of cells.

i. Global origin. The Contractor shall use the standard global origin of zero "X" and "Y" coordinates at the lower left corner of the X-Y plane.

j. Views. Only view one (1) and five (5) will be active. All locks will be off except keypoint snap and all displays will be on except text nodes and grid.

k. Text/Font. Most map features constitute either graphics or text and are on separate levels. However, in some cases, text will be placed on the same level as the graphics. Examples of this would be the "S" embedded in the line for sanitary sewer or the "W" in the line for water. Font 24 shall be used for utility descriptions and font 127 for all remaining text. See Appendix A for breakdown of level assignments, level symbology, and text size.

5. SPECIAL REQUIREMENTS:

a. There shall be no cutting of trees, and brush cutting shall be kept to a minimum.

b. Excessive marking with paint, flagging, etc. will be avoided.

c. The Contractor shall comply with all applicable safety regulations of the current U.S. Army Corps of Engineers Safety and Health requirements manual EM 385-1-1, and shall acquaint himself and his personnel with the safety requirements governing the area in which the work is being done.

6. MATERIAL TO BE FURNISHED CONTRACTOR:

a. Utility maps (1" = 40') as required for areas of work.

(1) Storm drainage
(2) Sanitary sewer
(3) Water
(4) Electrical
(5) Street lighting
(6) Telephone
(7) Gas
(8) Fire alarm
(9) Heating

b. Control listing and map.

c. Collection Point Codes, font library (FONTLIB.NPS), cell file (CIVSUR.CEL), and seed file (SEED.DGN).

d. Field book example.

e. Final product example (1" = 40' plot).

f. Appendix A, Level Assignments and Symbology.

7. REVIEW/SUBMITTAL:

a. Initial submittal - The Contractor shall provide the Government one (1) completed Intergraph design file and hard copy at 1" = 40' for review to assure compliance with project specifications. The Government reserves a period of five (5) calendar days to comment on this submittal.

b. Pre-final submittal - The Contractor shall generate 3D graphic files of utility data (Intergraph design files) and a 1" = 40' plot of all files for all areas. Digital data shall be supplied on a 5-/4" 1.2 MB floppy disk, 3-1/2" 1.44 MB floppy disk, or a 5.25" 44 MB removable cartridge. The Government reserves a period of ten (10) calendar days to comment on Contractor's work.

c. Final submittal - The final submittal shall contain all the revisions required as a result of the Government's pre-final review. The final submittal shall consist of:

(1) Intergraph design files on 3-1/2" or 5-1/4" floppy disk or cartridge for each file
(2) 1" = 40' plots of individual data files
(3) All items in paragraph 6 above
(4) All computations (in folder)
(5) All field books (reduced and checked)
(6) Floppy disks of all raw field data and final coordinate data

8. REPORTS: The Contractor shall submit monthly progress status reports during the duration of the project.

9. SCHEDULE AND DELIVERY: The submission schedule shall commence on the day notice-to-proceed is issued and will run consecutively for the number of days shown in Appendix B. All submittals shall be accompanied by a letter of transmittal.

Enclosures:
Appendix A
Appendix B
(Appendices to be included
in an actual scope of work.)